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(54) **Packaged cooked meat and low pH sauce having extended refrigerated shelf life**

Verpacktes gekochtes Fleischprodukt und Sosse mit niedrigem pH-Wert und verlängerter
Lagerbeständigkeit

Produit de viande cuit avec sauce à faible pH, emballé, permettant une longue durée de conservation

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• **Cuccia, Jennifer**
Waunakee, Wisconsin 53597 (US)

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(74) Representative: **Smaggasgale, Gillian Helen**
W.P. Thompson & Co,
55 Drury Lane
London WC2B 5SQ (GB)

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(73) Proprietor: **KRAFT FOODS HOLDINGS, INC.**
Northfield, Illinois 60093-2758 (US)

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(72) Inventors:
• **Thrasher, Kent**
Sun Prairie, Wisconsin 53590 (US)
• **Painter, Cory J.**
Cottage Grove, Wisconsin 53527 (US)
• **Brown, Keena**
Madison, Wisconsin 53704 (US)
• **Ticknor, Doris**
Fitchburg, Wisconsin 53711 (US)

• **SCHLYTER JIMMY H ET AL: "The effects of**
diacetate with nitrite, lactate, or pediocin on the
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Description

Background of the Invention

[0001] The invention generally relates to packaged precooked meat which is able to be stored under refrigerated conditions for extended time periods without developing a wet and soft texture, off-flavors, or undesired microbial growth. More particularly, the present invention relates to cooked meat cuts which are precooked and sealed into a pouch together with a low-pH sauce to provide a non-frozen packaged meat product having an extended refrigerated shelf life.

[0002] Methods and processes for packaging meat products in order to enhance their shelf stability are generally well-known. One category of providing shelf-stable packaged meat-containing products relies upon freezing those products with the objective of maintaining important flavor qualities and controlling microbial growth. Other approaches include packaging under aseptic conditions in the form of canned or retorted products or by using other technologies which tend to undesirably change the character of the meat products. There is a tendency for such products to lose their characteristic texture and to have their taste detrimentally affected. In general, meat freezing is still a preferred approach for long-term storage of meats and meat products.

Freezing generally preserves flavor attributes and texture during reasonably long frozen storage periods.

[0003] In some instances, there is a desire to avoid frozen meat products for a variety of reasons. One may wish to avoid the time and inconvenience of having to proceed through a thawing operation. This is especially important in marketing meat products which are intended to exhibit a minimum of preparation time or to require minimal advance planning to allow for adequate defrosting time. Meat products which are marketed frozen can also give the impression of having a less fresh quality when compared with meat products which are available in a refrigerated, non-frozen state.

[0004] Refrigerated, non-frozen meat products are widely distributed in refrigerated food cases. Often, such products are in the nature of butchershop products which are pre-cut or pre-portioned and typically packaged in a simple manner suitable for self-serve refrigerated meat cases. These types of refrigerated meat cases are generally recognized as a fine source of so-called fresh meat products. The refrigerated shelf life of meat products marketed in this manner is necessarily relatively short and can require special handling and maintenance.

[0005] At times, meat products within refrigerated, non-freezing marketing display cabinets are of the precooked variety. It has been found that pre-cooked meat products can be especially problematic in terms of maintaining flavor without developing characteristic and often unacceptable off-flavors. Refrigerated, non-frozen

meat products likewise can be problematic in terms of microbial growth control. This is the case for even cooked meat products. In fact, cooked meat products are especially problematic when it comes to avoiding the development of off-flavors when stored under non-freezing refrigeration, even when that storage is for a relatively short time, for as short as a few days or even only several hours. Characteristic warmed-over flavors develop which render precooked meat products undesirable, even after they are heated during meal preparation.

[0006] Previous approaches recognize the importance of addressing these general concerns and problems. For example, Brotsky (U.S. Patent No. 4,788,070) describes meat emulsions including common salt and other components, which are then shaped and cooked, with attention being paid to low interior acid levels for meat products of this general type. This patent indicates the importance of rapid treatment of the meat particles in the emulsion, which are to be of a size smaller than meat cubes of intact muscle. Tonner (U.S. Patent No. 4,262,027) relates to ground meat with an acid source having a slow release characteristic which will acidify after heating is initiated. Bernatovicz (U.S. Patent No. 3,985,904) relates to ground meat products having fillers. The use of citric acid in cooked ground meat products is discussed.

[0007] Other approaches address meat cuts which are not necessarily processed as ground products. Szczesniak (U.S. Patent No. 4,075,357) relates to intermediate moisture meats having a preservation system including a common chloride salt with certain organic salts, while recognizing that it can be useful to lower the pH of meats from the near-neutral range of from 5.5 to 8.0 down to a pH of as low as 3.0 by the use of food grade acids. Anders (U.S. Patent No. 4,888,191) recognized that *Clostridium botulinum* can be addressed in fish and poultry through the use of lactate salts, either alone or combined with agents such as sodium chloride or sodium nitrite. Included are turkey breasts injected with a brine solution, as well as the lactate salt. Ruzek (U.S. Patent No. 5,780,085) describes treating fresh pork cuts with a treatment solution having a lactate buffer salt, a phosphate sequesterant, and a diacetate flavor enhancement agent.

[0008] Morgan (U.S. Patent No. 5,298,270) describes a system of barbecue cooking, processing, and storage of meats such as ribs, or chicken, which involves two successive barbecue cooking steps followed by applying a special meat dependent sauce having a pH factor between 3.4 to 3.7 to the meat. Typical ingredients for this sauce include, in unspecified amounts, tomato concentrate, sugar, water, distilled vinegar, salt, spices, natural smoke flavoring, high fructose corn syrup, dehydrated onion, sodium benzoate, and citric acid. Next the meat is bagged and hermetically sealed in heavy transparent cryovac bags before barbecue cooking the meat for a third time, cooling, freezing, and shipping to the

end user.

[0009] Gics (U.S. Patent No. 5,900,263) discloses a food package including a tray, a sleeve surrounding the tray, and a rigid leg member extending from the back panel of the sleeve.

[0010] Jimmy H. Schlyter *et al.*, International Journal of Food Microbiology, 19 (1993), pages 271 to 281, discuss the effects of diacetate with nitrite, lactate, or pediocin on the viability of *Listeria monocytogenes* in turkey slurries. These authors reported that sodium diacetate alone can be used to delay growth of *L. monocytogenes* in turkey, and that an additional level of safety can be achieved using diacetate in combination with sodium lactate or pediocin.

[0011] Brooks *et al.* (International Patent Publication No. WO 92/03938) disclose how proteinaceous, and in particular, meat products can be made shelf-stable by acid heat treatment in the presence of a polymeric acid such as alginate acid.

[0012] Fontenau *et al.* (U.S. Patent No. 4,597,974) propose formulation of edible sauce and gravy compositions which incorporate as an essential ingredient a combination of rice starch and carob bean flour.

[0013] Hansson (European Patent Publication No. 0 533 959 A1) describes a process for preparing a frozen meal which comprises cooking pieces of meat, cooling, adding a thickening agent, mixing, forming into a block, freezing and finally packing with one or more vegetables.

[0014] Kaplow *et al.* (U.S. Patent No. 3,634,104) describe a process for imparting micro-organic stability to a spoonable intimately mixed food product, such as a beef stew intended for non-refrigerated storage, which comprises infusing the solids phase with an effective concentration of a solute selected from sugars, salts, sorbitol, glycerol, propylene glycol and mixtures thereof and independently formulating an aqueous liquid phase which also contains one of the specified solutes before mixing the phases and packaging the mixed phases.

[0015] Guarino (U.S. Patent No. 5,863,578) describes packaging for seafood that may have been coated in sauce or marinated in which the seafood is placed on a pallet which is then vacuum packed between upper and lower sheets of plastic film.

[0016] Although approaches such as these have been suggested, satisfactory industrially prepared and packaged cooked meat cuts in sauces have not been available in a form which achieves extended shelf life attributes even when stored under refrigerated, non-frozen conditions. Thus, there is a potentially important category of food products which are convenient to distribute industrially and market, while also requiring a minimum amount of consumer preparation. This potentially important category relates to meat products which are quick and easy to prepare, typically being eaten after a brief heating period, such as by microwave heating close in time to consumption. More particularly, this category preferably includes precooked, uncured meat

cuts. A primary reason for the rarity of refrigerated, precooked and uncured meat cuts being available to consumers through retail markets is the susceptibility of such meat components to decline in meat quality during long-term refrigerated storage.

[0017] In this regard, meat quality decline can involve three principal aspects. Microbial quality typically deteriorates under refrigeration, especially under conditions at which the cooked cut is neither frozen nor cured. Psychotropic bacteria can multiply during refrigerated storage and reduce acceptable shelf life of the meat.

[0018] Another aspect of meat quality deterioration, which is of particular concern when cooked and uncured meat products are refrigerated, particularly above meat-freezing temperatures, is flavor quality deterioration. Maintenance of acceptable flavor of cooked, uncured meat is challenged by the rapid onset of off-flavors, which can be known in the art as "warmed-over flavor" (at times referred to herein as "WOF"). The development of these types of off-flavors typically occurs within hours of cooking. Consequently, consumer acceptability of precooked, uncured meat products declines very rapidly with the length of storage time. It is generally accepted that the WOF phenomenon is caused by autoxidation of meat lipids. WOF characteristics generally are associated with the characteristics of oxidative rancidity. At a minimum, unpleasant flavor notes develop in short order when precooked meat cuts are wrapped and refrigerated.

[0019] A third meat quality deterioration can occur when providing meat cuts which are flavored or which are otherwise treated with relatively low pH compositions. It has been found that precooked products within this general category can be faced with a problem of excess tenderness or a mealy feel and appearance, thereby providing a product which is not of a satisfactory texture characteristic of a freshly cooked meat cut. It is believed that this disagreeable characteristic is due to a reduction in the water holding capacity of the cooked meat. This water holding capacity reduction is believed to lead to water purge and resulting yield loss, as well as the mealy and soft, tending toward slimy feel and appearance of such packaged precooked meat cuts. It is generally believed that cooking with a low pH sauce or component moves the meat to near or at its isoelectric point. Meat pH reduction which occurs prior to cooking reduces water holding capacity of the meat, causes it to lose water and thus yield.

[0020] These detrimental microbial, flavor and texture characteristics become more problematic during non-freezing refrigerated storage for extended time periods. To provide precooked meat products, particularly ones which are flavored, texture degradation, oxidative rancidity, significant bacterial count increases, and off-flavor development must be avoided or substantially retarded so as to provide cooked meat products or meat-containing products which are both safe and acceptably flavored.

Summary of the Invention

[0021] According to the invention there is provided a process for preparing a non-frozen, uncured packaged meat product having an extended refrigerated shelf life, comprising:

- (a) selecting an uncooked, uncured meat cut having an outer surface;
- (b) treating the uncooked, uncured meat cut with a marinade containing an inorganic salt, a lactate salt and a diacetate salt;
- (c) searing a substantial portion of said outer surface of the meat cut, and cooking the meat cut to provide a cooked meat cut having an internal temperature of at least 155°F (68°C);
- (d) cooling said cooked meat cut to below room temperature and without internally freezing the cooked meat product;
- (e) placing the thus cooled cooked meat cut into a pouch, and placing a low pH sauce into said pouch, said sauce having a pH of less than 4.5;
- (f) sealing the pouch with the cooked meat cut and the low pH sauce therewithin to provide a sealed pouch containing cooked meat and low pH sauce; and
- (g) marketing said sealed pouch having a cooked meat and low pH sauce in a refrigerated, non-frozen condition, said meat and sauce having an extended refrigerated life.

[0022] The invention also relates to a refrigerated packaged food product, comprising:

- a tray having a bottom wall, an annular rim and a sidewall joining together said bottom wall and said annular rim, said tray being made of a material suitable for heating food therewithin by a microwave oven;
- an indent within said annular rim of the tray;
- a lid removably secured onto said annular rim of the tray and over said indent;
- a releasably sealed pouch positioned within said tray with said lid secured onto said annular rim;
- a food product including a cooked meat product obtainable by following steps (a) to (d) set out above and a sauce having a pH of less than 4.5 prior to its combination with the cooked meat product, said food product being sealed within said pouch, said food product being at an unfrozen, refrigerated temperature;
- free space between said sealed pouch and said tray sealed with the lid; and
- a sleeve portion over said tray which has the lid sealed thereonto.

[0023] The present invention is thus directed to a refrigerated packaged food product and process for pre-

paring the food product. Meat cuts are processed and packaged with a selection from a variety of sauces and to provide precooked meat cuts in sauces in a form which has an extended shelf life of months for meat cuts which exhibit and maintain control of microbial growth and avoid mealy, wetter and softer texture characteristics, while maintaining good flavor attributes and retarding warmed over flavor development. Unfrozen meat cuts are treated with a marinade, followed by cooking and chilling. Thereafter, the cooked, uncured cuts are placed into a pouch, together with a low pH sauce, which pouch is then sealed and placed into a refrigerated, non-frozen environment. The product is marketed and sold. In a preferred embodiment, the pouch containing the food product is placed within a tray which is also sealed and part of the refrigerated package.

[0024] It is accordingly a general object of the present invention to preserve precooked meat cuts for long term refrigerated storage.

[0025] Another aspect of the present invention is to provide improved precooked and uncured meat products, processes for preparing and using same, and kits incorporating same, which meat products retard microbial growth, off-flavor development, and mealy characteristics.

[0026] Another aspect of this invention is to provide refrigerated, never frozen, precooked and uncured meat cuts in a form suitable for sale to consumers through retail markets by imparting microbial and flavor shelf-stability for lengths of time suitable for retail markets and channels of trade and without causing water transfer out of the meat, which would result in mealy, wet texture and yield loss.

[0027] There is accordingly described herein how to combine formulation, processing and packaging features in preparing cooked meat products having a shelf life of at least 60 days, the formulation features including treatment with a marinade, and the processing including full cooking prior to the addition of an acidic sauce.

[0028] There is also described how to provide non-frozen whole muscle meat cuts or portions which, although unground, maintain long-term shelf stability and flavor maintenance and texture maintenance without subjecting same to freezing.

[0029] Also taught herein is a marinade formulation including a lactate, a phosphate, and a common salt which is used to treat an unfrozen meat cut prior to searing, cooking and chilling, done prior to the addition of any low pH sauce for contact with the meat.

[0030] These and other objects, aspects, features and advantages of the present invention will be apparent from and clearly understood through a consideration of the following detailed description.

Brief Description of the Drawings

[0031] In the course of this description, reference will be made to the attached drawings, wherein:

FIG. 1 is a top perspective view of packaged treated meat cuts and sauce according to an embodiment of the invention;

FIG. 2 is a cross-sectional view along the line 2-2 of FIG. 1;

FIG. 3 is a top perspective view of the packaged product as generally shown in FIG. 1, but with the over sleeve removed and the tray opened;

FIG. 4 is a cross-sectional view along the line 4-4 of FIG. 3; and

FIG. 5 is an end view of the tray illustrated.

Description of the Preferred Embodiments

[0032] Originating meat cuts according to the invention are most advantageously from poultry sources, including chicken, turkey and other fowl. White meat cuts are especially advantageous meat cut sources. Examples include breast fillets, strips and portions, including pre-severed strips and chunks. The invention finds particularly useful application when the originating meat cuts have length or width dimensions of at least one inch (2.54 cm).

[0033] When there is a desire to practice the invention with other originating meat sources, such sources also can be suitable for use. Other meats include pork, beef and lamb sources. The invention currently has especially useful commercial application for poultry originating meat cuts. This being the case, special emphasis is placed herein on poultry cuts in general and chicken cuts in particular.

[0034] Another important advantage of the invention is that the meat cuts can originate from never frozen sources. Typically, the sources will be whole muscle pieces or portions. To the extent that unfrozen food supplies are readily available at a commercially acceptable cost, the meat sources themselves will be of the fresh variety. Thus, the meat cuts are not cured, either before, during or after processing according to the invention. The invention is particularly unique in its ability to improve the shelf stability, flavor stability and texture maintenance of meat cuts which are not ground or comminuted sources. Whatever the ultimate origin of the meat cuts, they will begin the process as unfrozen cuts.

[0035] In proceeding with the processing, these unfrozen meat cuts are treated with a marinade which has been found to be especially suitable when used in combination with the other major features of the process. The marinade treatment is carried out in accordance with acceptable food-processing procedures. These include tumbling and contacting the surfaces of the meat cuts with the marinade. The length of treating or contacting should be adequate such that the components of the marinade penetrate into and typically through the external surfaces of the meat cuts. An important objective of this treatment is to have the marinade components remain with the meat cuts during subsequent treatment, especially during the cooking operation.

[0036] A preferred marinade formulation is comprised of one or more lactate salts, a diacetate salt, and a common inorganic salt. This is an aqueous composition, and typically the majority of the marinade is water. Another component which can be included is a phosphate salt or complex phosphate salt. While not an essential component, flavoring agents can be included, such as chicken flavor, as can be binding agents or sweetening agents, an example of other possible agents being dextrose.

[0037] The lactate salts usually comprise either or both of sodium lactate and potassium lactate. Because many lactate products are available as a syrup, this form of lactate addition typically is practiced. A typical syrup will be a 60 percent solution of the lactate salt within water. The lactate will be present in the marinade at levels of between 0.01 weight percent and up to the legal limit for lactate in meat products, which is 4.8 weight percent. These percentages are based upon the total weight of the meat cuts and the marinade. When considered in terms of the marinade itself, the lactate can be present at a level of between 0.06 weight percent and 28.8 weight percent. Preferably, the amount of lactate is between 1.5 and 3 weight percent, based upon the total weight of the meat and marinade. This is between 9 and 18 weight percent, based upon the total weight of the marinade.

[0038] Diacetate salt levels are between 0.01 weight percent and up to the legal limit of a diacetate in meat products, namely 0.25 weight percent. These are based upon the weight of the total meat and marinade composition. When considered in terms of the marinade alone, the diacetate component is present at a level of between 0.06 weight percent and 1.5 weight percent. For a typical diacetate component such as sodium diacetate, the preferred range for this component is between 0.05 and 0.2 weight percent, based upon the total weight of the meat and marinade. Based upon the total weight of the marinade itself, the preferred level is between 0.3 and 1.2 weight percent.

[0039] Suitable inorganic salts are typically sodium chloride, potassium chloride and the like, generally identified herein as common inorganic salts. The common inorganic salt component is present at a level of between 0.01 and 3 weight percent, based upon the total weight of the meat and marinade. Based upon the weight of the marinade alone these levels are between 0.06 and 18 weight percent. Preferably, the common inorganic salt component is present at between 0.75 and 1.5 weight percent, based upon the total weight of the meat and marinade. Based upon the weight of the marinade alone, the common inorganic salt component is present at between 4.5 and 9 weight percent.

[0040] A typical marinade will have a water content of between 8 and 20 weight percent, based upon the total weight of the meat and marinade. When considered in terms based on the weight of the marinade only, water is present at between 50 and 85 weight percent. It will

be appreciated that some of the water content can be contributed by other components, most notably by the lactate syrup component. Preferred water ranges are between 10 and 15 weight percent, based upon the total weight of the meat and marinade. Based upon the weight of the marinade only, water ranges between 55 and 80 weight percent.

[0041] The marinade compositions can include a phosphate salt, often a complex phosphate salt. When this phosphate component is a compound such as sodium tripolyphosphate, this component will be present at a level of between 0.1 and 2 weight percent. This is based upon the total weight of the meat and marinade. Based upon the weight of the marinade alone, this phosphate component would be present at levels of between 0.6 and 12 weight percent. Preferably, when present, the phosphate component will be at a level of between 0.2 and 1 weight percent, based upon the total weight of meat and marinade. Based upon the weight of the marinade alone, this component would be present at between 1.2 and 6 weight percent.

[0042] Other components can be included. A typical flavoring component or combination of flavoring components can be present at between 0.5 and 3 weight percent, based upon the total weight of the meat and marinade. When based upon the weight of the marinade alone, this will be between 3 and 18 weight percent. Other additives, such as humectants, thickeners, sweetening agents and the like can be present. An example of an additional ingredient is dextrose. When present, levels are between 0.1 and 2 weight percent, based upon the weight of the meat and marinade, or between 0.6 and 12 weight percent based upon the weight of the marinade only.

[0043] The marinade will be combined with the meat cuts at suitable levels so as to achieve the needed marinating function. At this stage of the process, the marinade will comprise between 10 and 25 weight percent, while the meat cuts will comprise between 75 and 90 weight percent of the total meat and marinade composition within the mixture added to the mixing container.

[0044] Before cooking the marinated meat cuts, they can be treated with a caramel component or formulation. A commercially available formulation which is suitable in this regard is Maillose®, of Red Arrow Products Co., Inc. This formulation is an aqueous solution of caramel coloring produced according to food regulations. Usage levels can vary between 0.3 and 3 weight percent, based upon the weight of the marinated meat cuts. Typically, this component will be applied as a solution (such as for spraying) having a ratio of 2:1 of Maillose: water.

[0045] Whether or not thus additionally treated, the marinated meat cuts are cooked. Preferably, the cooking includes an initial high-heat searing of the meat cuts. Cooking will proceed thereafter so as to achieve full cook characteristics as required by food processing regulations. The searing operation is done rapidly and at high temperature so as to provide a denatured protein

skin barrier. This has been found to assist in reducing water transfer out of the meat. Full cooking is typically indicated when the internal temperature of the meat reaches 155°F or higher (68.3°C). Any industrial oven, such as one suitable for industrial flow-through cooking, can be used.

[0046] The cooked meat cuts are subjected to chilling in accordance with procedures suitable for industrial handling of meat products. For example, a spiral freezer will chill fully cooked chicken fillets down to about 27°F (-2.8°C) in about one half an hour. Cooling is accomplished in accordance with controlling governmental regulations. The chilling does not freeze the meat, although a so-called crusting can take place. The objective of the chilling step is not to freeze the meat cuts, but to rapidly chill in accordance with good meat handling practices.

[0047] The precooked and thus chilled meat cuts are next combined with a low pH sauce. The sauce provides a variety of flavors to the meat cuts, depending upon the particular product being prepared. These can be, for example, barbecue flavored, teriyaki flavored, garlic flavored, herb flavored, either alone or combined with other flavorings such as lemon or citrus, pepper, or the like. A principal feature of the sauce is that it has a low pH, meaning a pH of below 4.5, typically of 4.2 or below, preferably of 4.0 or below. This is the pH of the sauce prior to its addition to the fully cooked meat cuts. This low pH characteristic is provided by including a food grade acid within the sauce. Often, this is achieved by having vinegar within the sauce. A typical vinegar includes acetic acid. An example of a vinegar which is instrumental in providing an adequately low pH to such sauces is 120 grain vinegar. Many suitable sauces will have a pH of 4.1 or below. Other suitable sauces will have a pH of 3.8 or below. Some can have a pH of 3.5 or below. A typical pH range for the sauce prior to its addition to the meat cuts is 2.5 to 4.2. A preferred range is 3 to 4.0. Another preferred range is 3 to 3.5 pH.

[0048] A typical low pH sauce will include between 40 weight percent and 65 weight percent water, based upon the total weight of the sauce. Typical sauce water activities will be on the order of 0.92 or lower. Generally, beneficial effects according to the invention will be achieved by low pH sauces having a low water activity. Broadly, sauce water activity will be below 0.92. Some sauce water activities will be at 0.9 or below. An advantageous common inorganic salt level is between 2 and 3 weight percent, based on the total weight of the sauce. It will be especially advantageous to have sauces with a combination of these pH values, water activities and salt levels.

[0049] Various low pH sauces are available commercially. Examples include Kraft® Honey Hickory BBQ sauce, Bulls-Eye® teriyaki sauce, McCormick® Golden Dip teriyaki sauce, sauce formulations including flavoring from Firmenich®, Bulls-Eye® garlic herb grilling sauce, lemon pepper flavored sauces, as well as vari-

ous other commercially available sauces or other sauces formulated to have the desired flavor, while exhibiting the requisite low pH. A typical sauce formulation will include water, vinegar, starch, vegetable oil, flavoring, sweetener, gums and other typical sauce formulation components.

[0050] Adding the low pH sauce to the fully cooked product is an important feature of the process. Especially suitable in this regard is adding the low pH sauce to the cooked and chilled meat cuts shortly before hermetic packaging together of the cooked meat cuts and low pH sauce. It will be appreciated that the cooked meat pieces most often will have a pH considerably higher than that of the sauce with which they are combined. Such combined pH values will be on the order of 5 to 6.3 once a generally equilibrated condition is reached. To a limited extent, the low pH value required of the sauce will depend somewhat upon the condition of the meat cuts prior to the combining step. Examples of relevant meat condition factors are pH, microbial activity, temperature and the like. For most meat cuts, the sauce pH values of the sauces noted herein will be adequate. It is also preferred that the temperature of the sauce be on the order of that of the cooked and chilled meat cuts, typically at or below 40°F (4°C).

[0051] It is preferred in that the hermetic sealing together of the fully cooked meat cuts and the low pH sauce will be under so-called vacuum conditions. Packaging can be carried out on commercially available form, fill and seal equipment, or simply within suitable vacuum packaging commercial equipment. When equipment is used which incorporates a forming operation, usually both a forming film and a non-forming film will be used. A suitable forming film is a Curlon® forming film available from Curwood, a preferred example being Curlon 1251. A typically suitable non-forming film is Curlon 1915G. Preferably, the hermetically sealed pouch has a peelable seal, such as one provided by an adhesive, by mating strips, and the like. Typical peel adhesive formulations also are available from Curwood. In one aspect of the invention, the thus vacuum packaged fully cooked meat cuts and low pH sauce are ready for entering commercial distribution channels. The invention permits the equipment of these distribution channels and the cases of the marketing and sales channels to be refrigerated and not frozen. This allows the provision of unfrozen meat cuts which are ready to use, with or without heating. Typically, however, the meat cuts will be heated, such as in a consumer microwave oven, prior to cooking, whether with the sauce or without.

[0052] Another aspect of the packaging which can be used in connection with the fully cooked meat cuts and low pH sauce is to provide a protective tray within which the hermetically sealed pouch is placed. This protective tray physically protects the hermetically sealed pouch, both from unintentional damage and potentially intentional tampering. The tray, which itself includes a sealing lid, also provides assistance in maintaining the refriger-

ated temperature in storage. There will be "dead air" or gas space, often merely air space, between the outside of the pouch and the interior surface of the tray. Once chilled, this gas provides an additional buffer or sink for maintaining a desired refrigerated, non-frozen temperature.

[0053] The tray also can provide the function of a convenient cooking tray during microwave heating of the food product prior to consumption. With this approach, the food product, whether only the cooked meat cuts or the cuts within the low pH sauce, will be opened, and the contents poured in the tray, while its lid is peeled back, opened or removed.

[0054] Refrigerated temperatures for the products are consistent with those provided in wholesale storage and transportation facilities and vehicles. They also will be in accordance with temperatures and air flow conditions of refrigerated retail storage cases. Generally speaking, these refrigerated conditions are such that the packaged products remain unfrozen. A typical refrigerated temperature is between 32°F (0°C) and 44°F (7°C), typically on the order of about 40°F (4.4°C).

[0055] With particular reference to the food packaging which is illustrated, FIG. 1 through FIG. 5 generally show at 21 a refrigerated packaged food product. Included is a tray 22 having an internal volume defined by a sidewall 23 and a bottom wall 24. Sidewall 23 can include ridges 36 for added rigidity of the tray. Sidewall 23 includes an annular rim 25. Closure of the tray in this illustrated embodiment is accomplished by a lid 26. A typical lid is a polymeric lidding sheet which is flexible and releaseably sealed to the annular rim 25. In the illustrated embodiment, a sleeve 27 provides added mechanical protection and barrier properties, for example reducing photo-oxidation. Sleeve 27 also provides a convenient means for packaging graphics. The tray and sleeve, as well as the sealed lid and the oxygen barrier pouch reduce oxygen penetration and exposure of the food.

[0056] Positioned within the volume of the tray and between the tray and the lid is a pouch 31 containing the food product. It will be noted that, even with the pouch within the tray sealed by the lid, free space 32 remains. This free space provides an opportunity for gas, typically, air, to provide a sink or buffer volume as generally discussed herein.

[0057] Pouch 31 includes fully cooked meat cuts 33 and a low pH sauce 34. Preferably, the pouch is vacuum sealed and securely closed by suitable conventional approaches. Sealing may be accomplished by an adhesive, especially a peelable adhesive, or by suitable mechanical arrangements. An interlocking seal strip arrangement 35 is suitable in this regard.

[0058] In use, the combined meat cuts and sauce remain hermetically sealed and refrigerated within the pouch until such time as heating and serving are desired. At that time, the seal 35 is broken, the pouch is opened, and the meat cuts and sauce are removed from the pouch. They can be placed within a suitable heating

container. If desired, only the meat cuts can be heated for serving, when it is desired to not utilize the combination of sauce and meat. It has been found that the sauce flavor is delivered to the meat cuts in their mutual chilled environment, and the sauce flavor is evident in the meat cuts even after washed from the surfaces of the cooked meat cuts which had been refrigerated with the sauce.

[0059] In the illustrated kit embodiment, the tray 22 serves well as a heating container for heating within a microwave oven, for example. In that instance, the desired content from the pouch is emptied into the tray. If desired, the lid 26 can be re-positioned onto the annular rim 25 for spattering protection and heat maintenance in accordance with typical microwave heating practice. In that instance, annular rim 25 includes a depression 37 to facilitate venting when the lid is secured to the annular rim, including during re-heating.

[0060] When the tray is used as a container for heating the edible contents, it preferably includes ramped corners 38 to facilitate movement of the sauce away from the bottom corners of the tray and towards the center of the tray. These slanted corner ramps also increase corner strength. When the tray component is provided, it preferably is made of a high performance polymer which will withstand household microwave heating, as well as show resistance to damage during storage, transport, display and general handling. A suitable material is a blended copolymer and homopolymer of polypropylene. Polymers of this type are available from Curwood.

[0061] Exemplary illustrations of the disclosure herein are provided in the following examples.

Example 1

[0062] Chicken breast fillets were treated with a marinade according to the invention and were seared on both sides. They were thereafter sprayed with a 2:1 Maillasse:water solution. These fillets were placed in a combination oven which was set on heat plus steam at 400°F (204°C). The fillets reached an internal temperature of at least 160°F (71°C) and were then chilled. The cooked fillets were packaged in vacuum pouches with three different sauces. Several packages contained Kraft® honey hickory barbecue sauce (pH of 3.2). Several other pouches contained McCormick® golden dip teriyaki sauce (pH of 4.2). After six days storage under refrigerated, non-frozen conditions, the fillets were removed from the pouches. In order to evaluate transfer of flavor from the sauce to the cooked fillets, all of the sauces were removed from the fillets, and the fillets were rinsed with tap water. These fillets were heated and tasted. In each instance, the tasting indicated that each sauce flavor was delivered to the fully cooked fillet within the refrigerated environment provided by the pouch under refrigeration. No adverse texture problems were observed, there being no indication of a mealy, wet or soft texture or consistency.

Example 2

[0063] A marinade was prepared and combined with chicken breast fillets. The weight percents of the components were as follows, each percent being based upon the total weight of the chicken breast fillets and the marinade components: chicken breast fillets 83.33 percent; water 9.92 percent; chicken flavoring 1.25 percent; sodium lactate 2.45 percent; potassium lactate 1.00 percent; sodium chloride salt 1.10 percent; dextrose 0.51 percent; sodium tripolyphosphate 0.334 percent; and sodium diacetate 0.10 percent. These were 4 ounce (113.4 g) fillets, and the marinated fillets were cooked and chilled. The chilled yield average was observed to be 77.1 weight percent. Cooking of a group of these fillets was done within a Progrill® system at 345°F (174°C) for 65 seconds, creating a seared protein skin of the fillets. These were passed to a combination oven for a cook time of about 4 minutes at 500°F (260°C), under steam at about 600 pounds (272.16 kg) per hour. Grill marks were imparted to the fillets by a charring device. Average cooked yield was 82.6 weight percent (standard deviation 0.73 percent). After chilling, the cooked and chilled fillets had an average yield of 77.08 weight percent (standard deviation 0.94 percent).

Example 3

[0064] Fillets were marinated substantially in accordance with Example 2, cooked and chilled. These were combined with one of three different sauces, a Kraft® honey hickory barbecue sauce at a pH of 3.2, and a teriyaki sauce at a pH of 4.2. They were vacuum packaged in pouches and stored under refrigeration for three months. Other pouches were control products which were identical except no sauce was added prior to vacuum packaging. The control fillets showed an increase in microbial activity from 4 weeks through to 10 weeks of refrigerated, vacuum sealed storage. The increase was from one Log CFU/gm at 4 weeks, 2.5 Log CFU/gm at 8 weeks, and 3 Log CFU/gm at 10 weeks. The teriyaki sauce treated fillets were at about one Log CFU/gm at 4 weeks, and remained at that level, both at 8 weeks and 10 weeks. The low pH barbecue sauce treated fillets were at about 1 Log CFU/gm at 4 weeks, and were at about the same value at 8 weeks and at 10 weeks. The three low pH sauces had less than 10 col. after 10 to 13 weeks.

Example 4

[0065] A marinade formulation was prepared as follows: 70.07 weight percent water, 14.70 weight percent sodium lactate, 6 weight percent potassium lactate, 6.6 weight percent sodium chloride, 2 weight percent sodium tripolyphosphate, and 0.6 weight percent sodium diacetate, each being based upon the total weight of the marinade. This marinade was vacuum tumbled with

chicken breast fillets at a weight ratio of 5:1 of fillets: marinade. These fillets were seared and cooked until the internal temperature was about 160°F (71°C). The fillets were cooled and packaged with a variety of low pH sauces. These sauces included Kraft® honey hickory sauce at a pH of 3.27, Bulls-Eye® teriyaki grilling sauce having a pH of 3.8, Bulls-Eye® garlic herb grilling sauce, McCormick® golden dip teriyaki sauce having a pH of 4.2, and a formulated lemon pepper sauce having a pH of 3.3. After sauce and cooked fillet composites were vacuum packaged together, the following pH readings were noted: Kraft® honey hickory barbecue sauce and cooked fillets, 5.47 pH; Bulls-Eye® garlic herb grilling sauce and cooked fillets, 6 pH; and McCormick® golden dip teriyaki sauce with cooked fillets, 5.5 pH. The fillets were observed to be devoid of any visible mealy, wet or soft texture.

Example 5

[0066] Uncooked chicken strips were treated with a marinade together with a teriyaki flavor, such being a low pH treatment prior to cooking. After cooking and chilling, the chicken cuts were observed to have a mealy, wetter and softer texture than before cooking. Removing the low pH teriyaki prior to cooking, and moving it to addition promptly after cooking and chilling avoided these negative developments. Chicken cuts having the low pH sauce added after cooking resulted in little, if any detrimental affects to the texture.

[0067] It will be understand that the embodiments of the present invention which have been described are illustrative of some of the applications of the principles of the present invention. Numerous modifications may be made by those skilled in the art without departing from the true spirit and scope of the invention.

Claims

1. A process for preparing a non-frozen, uncured packaged meat product having an extended refrigerated shelf life, comprising:

- (a) selecting an uncooked, uncured meat cut having an outer surface;
- (b) treating the uncooked, uncured meat cut with a marinade containing an inorganic salt, a lactate salt and a diacetate salt;
- (c) searing a substantial portion of said outer surface of the meat cut, and cooking the meat cut to provide a cooked meat cut having an internal temperature of at least 155°F (68°C);
- (d) cooling said cooked meat cut to below room temperature and without internally freezing the cooked meat product;
- (e) placing the thus cooled cooked meat cut into a pouch, and placing a low pH sauce into said

pouch, said sauce having a pH of less than 4.5; (f) sealing the pouch with the cooked meat cut and the low pH sauce therewithin to provide a sealed pouch containing cooked meat and low pH sauce; and

(g) marketing said sealed pouch having a cooked meat and low pH sauce in a refrigerated, non-frozen condition, said meat and sauce having an extended refrigerated life.

- 2. A process according to claim 1, wherein said sauce has a pH of 4.2 or lower.
- 3. A process according to claim 1 or claim 2, wherein said sauce has a pH of 4.0 or lower.
- 4. A process according to any one of claims 1 to 3, wherein said sauce has a pH of 3.8 or lower.
- 5. A process according to any one of claims 1 to 4, further including adding a caramel composition to said outer surface of the meat cut before completion of the cooking operation.
- 6. A process according to any one of claims 1 to 5, wherein said treating with a marinade includes treating with a phosphate salt.
- 7. A process according to any one of claims 1 to 6, wherein said extended refrigerated shelf life of said marketing is at least 60 days.
- 8. A process according to any one of claims 1 to 7, wherein said extended refrigerated shelf life of said marketing is at least 90 days.
- 9. A process according to any one of claims 1 to 8, wherein said uncooked, uncured meat cuts have a length no less than one inch (2.54 cm).
- 10. A process according to any one of claims 1 to 9, wherein said meat cuts comprise poultry whole muscle.
- 11. A process according to any one of claims 1 to 10, wherein said sauce has a water activity of 0.92 or below.
- 12. A process according to any one of claims 1 to 11, wherein said sauce has a water activity of 0.9 or below.
- 13. A process according to any one of claims 1 to 12, further including the steps of:
 - providing a tray sized to accommodate said sealed pouch having the cooked meat and low pH sauce, and inserting said sealed pouch into

- said tray; and
closing said tray so as to seal said pouch there-
within to provide a packaged cooked meat and
sauce product.
14. A process according to claim 13, further including
adding a sleeve over at least a portion of said pack-
aged cooked meat and sauce product to provide a
sleeved packaged food product as the packaged
meat and sauce product having an extended refrig-
erated shelf life.
15. A process according to claim 13 or claim 14, where-
in said tray has an internal volume which is sized in
a manner to provide gas space between said sealed
pouch and said tray.
16. A refrigerated packaged food product (21), com-
prising:
- a tray (22) having a bottom wall (24), an annular
rim (25) and a sidewall (23) joining together
said bottom wall (24) and said annular rim (25),
said tray (22) being made of a material suitable
for heating food therewithin by a microwave oven;
an indent (37) within said annular rim (25) of
the tray (22);
a lid (26) removably secured onto said annular
rim (25) of the tray (22) and over said indent
(37);
a releasably sealed pouch (31) positioned with-
in said tray (22) with said lid (26) secured onto
said annular rim (25);
a food product including a cooked meat product
(33) obtainable by following steps (a) to (d) of
claim 1 and a sauce (34) having a pH of less
than 4.5 prior to its combination with the cooked
meat product, said food product being sealed
within said pouch (31), said food product being
at an unfrozen, refrigerated temperature;
free space (32) between said sealed pouch (31)
and said tray (22) sealed with the lid (25); and
a sleeve portion (27) over said tray (22) which
has the lid (25) sealed thereonto.
17. A refrigerated packaged food product according to
claim 16, wherein said low pH sauce (34) has a pH
of not greater than 4.2.
18. A refrigerated packaged food product according to
claim 16 or claim 17, wherein said low pH sauce
(34) has a pH of not greater than 4.0.
19. A refrigerated packaged food product according to
any one of claims 16 to 18, wherein said cooked
meat (33) comprises a meat cut having a length of
at least 1 inch (2.54 cm).

20. A refrigerated packaged food product according to
any one of claims 16 to 19, wherein said cooked
meat (33) is a poultry whole muscle cut.

21. A refrigerated packaged food product according to
any one of claims 16 to 20, wherein said low pH
sauce (34) has a water activity of 0.92 or below.

22. A refrigerated packaged food product according to
any one of claims 16 to 21, wherein said low pH
sauce (34) includes an inorganic salt at between 2
and 3 weight percent, based on the total weight of
the low pH sauce.

Patentansprüche

1. Verfahren zum Zubereiten eines nichtgefrorenen,
ungehärteten verpackten Fleischprodukts mit einer
verlängerten gekühlten Haltbarkeit, umfassend:

(a) Auswählen eines ungekochten, ungehärteten
Fleischstücks mit einer Außenfläche;

(b) Behandeln des ungekochten, ungehärteten
Fleischstücks mit einer Marinade, die ein
anorganisches Salz, ein milchsaures Salz und
ein Diazetatsalz enthält;

(c) Anbraten eines wesentlichen Teils der ge-
nannten Außenfläche des Fleischstücks, und
Kochen des Fleischstücks, um ein gekochtes
Fleischstück mit einer Innentemperatur von
mindestens 155°F (68°C) zu liefern;

(d) Abkühlen des genannten gekochten
Fleischstücks auf unter Raumtemperatur und
ohne inneres Gefrieren des gekochten Fleisch-
produkts;

(e) Legen des so abgekühlten gekochten
Fleischstücks in einen Beutel, und Geben einer
Soße mit niedrigem pH-Wert in den genannten
Beutel, wobei die genannte Soße einen
pH-Wert von weniger als 4,5 aufweist;

(f) Versiegeln des Beutels mit dem gekochten
Fleischstück und der Soße mit niedrigem
pH-Wert darin, um einen versiegelten Beutel zu
liefern, der gekochtes Fleisch und Soße mit
niedrigem pH-Wert enthält; und

(g) Vertreiben des genannten versiegelten
Beutels mit einem gekochten Fleisch und Soße
mit niedrigem pH-Wert in einem gekühlten,
nichtgefrorenen Zustand, wobei das genannte
Fleisch und die Soße eine verlängerte gekühlte
Haltbarkeit aufweisen.

2. Verfahren nach Anspruch 1, bei dem die genannte Soßen einen pH-Wert von 4,2 oder niedriger aufweist.
3. Verfahren nach Anspruch 1 oder Anspruch 2, bei dem die genannte Sauce einen pH-Wert von 4,0 oder niedriger aufweist. 5
4. Verfahren nach einem der Ansprüche 1 bis 3, bei dem die genannte Sauce einen pH-Wert von 3,8 oder niedriger aufweist. 10
5. Verfahren nach einem der Ansprüche 1 bis 4, das ferner einschließt, der genannten Außenfläche des Fleischstücks vor Abschluss des Kochvorgangs eine Karamellzusammensetzung hinzuzufügen. 15
6. Verfahren nach einem der Ansprüche 1 bis 5, bei dem die genannte Behandlung mit einer Marinade Behandeln mit einem Phosphatsalz einschließt. 20
7. Verfahren nach einem der Ansprüche 1 bis 6, bei dem die genannte verlängerte gekühlte Haltbarkeit für den genannten Vertrieb mindestens 60 Tage beträgt. 25
8. Verfahren nach einem der Ansprüche 1 bis 7, bei dem die genannte verlängerte gekühlte Haltbarkeit für den genannten Vertrieb mindestens 90 Tage beträgt. 30
9. Verfahren nach einem der Ansprüche 1 bis 8, bei dem die genannten ungekochten, ungehärteten Fleischstücks eine Länge von nicht weniger als einem Zoll (2,54 cm) aufweisen. 35
10. Verfahren nach einem der Ansprüche 1 bis 9, bei dem die genannten Fleischstücke ganzes Geflügelmuskelfleisch aufweisen. 40
11. Verfahren nach einem der Ansprüche 1 bis 10, bei dem die genannte Soße eine Wasseraktivität von 0,92 oder darunter aufweist. 45
12. Verfahren nach einem der Ansprüche 1 bis 11, bei dem die genannte Soße eine Wasseraktivität von 0,9 oder darunter aufweist. 50
13. Verfahren nach einem der Ansprüche 1 bis 12, das ferner die Schritte einschließt: 55

Vorsehen einer Schale mit Abmessungen zum Aufnehmen des genannten versiegelten Beutels mit dem gekochten Fleisch und der Sauce mit niedrigem pH-Wert, und Einlegen des genannten versiegelten Beutels in die genannte Schale; und
- Verschließen der genannten Schale derart, um den genannten Beutel in dieser zum Liefern eines verpackten Produkts aus gekochtem Fleisch und Soße zu versiegeln.
14. Verfahren nach Anspruch 13, das ferner einschließt, eine Hülle über mindestens einem Teil des genannten verpackten Produkts aus gekochtem Fleisch und Soße hinzuzufügen, um ein umhülltes verpacktes Nahrungsmittelprodukt als das verpackte Produkt aus Fleisch und Soße mit einer verlängerten gekühlten Haltbarkeit zu liefern.
15. Verfahren nach Anspruch 13 oder Anspruch 14, bei dem die genannten Schale ein Innenvolumen mit solchen Abmessungen hat, dass ein Gasraum zwischen dem genannten versiegelten Beutel und der genannten Schale geschaffen wird.
16. Gekühltes verpacktes Nahrungsmittelprodukt (21), umfassend:

eine Schale (22) mit einer Bodenwand (24), einem ringförmigen Rand (25) und einer Seitenwand (23), die die genannte Bodenwand (24) und den genannten ringförmigen Rand (25) miteinander verbindet, wobei die genannte Schale (22) aus einem Material besteht, das zum Erhitzen von Nahrungsmitteln darin durch einen Mikrowellenofen geeignet ist;

eine Vertiefung (37) innerhalb des genannten ringförmigen Rands (25) der Schale (22);

einen Deckel (26), der entferntbar auf dem genannten ringförmigen Rand (25) der Schale (22) und über der genannten Vertiefung (37) befestigt ist;

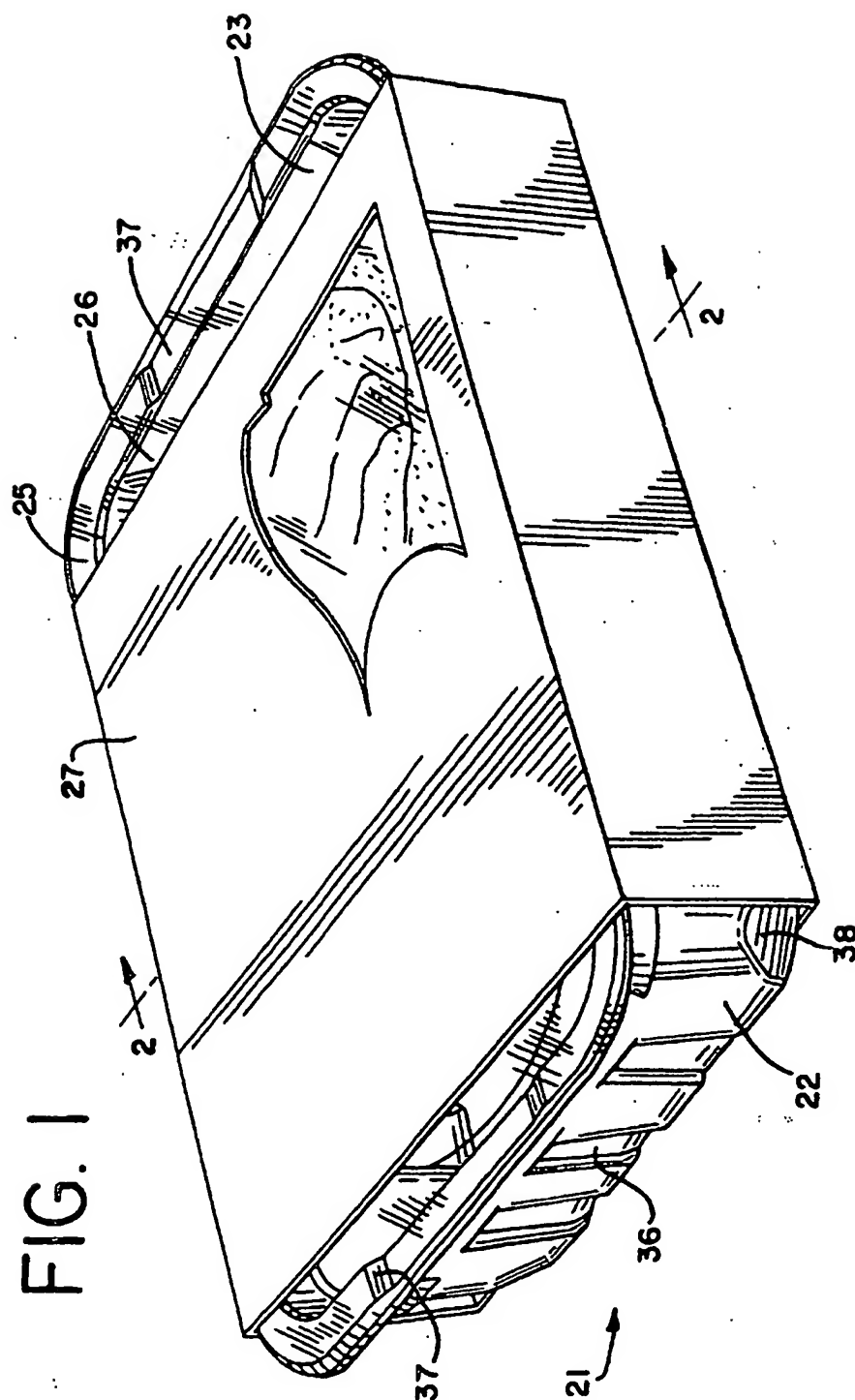
einen lösbar versiegelten Beutel (31), der innerhalb der genannten Schale (22) positioniert ist, wobei der genannte Deckel (26) auf dem genannten ringförmigen Rand (25) befestigt ist;

ein Nahrungsmittelprodukt, das ein durch die folgenden Schritte (a) bis (d) von Anspruch 1 erhältliches gekochtes Fleischprodukt (33) und eine Soße (34) enthält, die vor ihrer Kombination mit dem gekochten Fleischprodukt einen pH-Wert von weniger als 4,5 hat, wobei das genannte Nahrungsmittelprodukt innerhalb des genannten Beutels (31) versiegelt wird, und das genannte Nahrungsmittelprodukt auf einer nichtgefrorenen, gekühlten Temperatur ist;

freien Raum (32) zwischen dem genannten versiegelten Beutel (31) und der genannten Schale (22), die mit dem Deckel (25) versiegelt

- ist; und
- einen Hüllenteil (27) über der genannten Schale (22), die mit dem Deckel (25) auf ihr versiegelt ist. 5
17. Gekühltes verpacktes Nahrungsmittelprodukt nach Anspruch 16, bei dem die genannte Soße (34) mit niedrigem pH-Wert einen pH-Wert nicht höher als 4,2 aufweist. 10
18. Gekühltes verpacktes Nahrungsmittelprodukt nach Anspruch 16 oder Anspruch 17, bei dem die genannte Soße (34) mit niedrigem pH-Wert einen pH-Wert nicht höher als 4,0 aufweist. 15
19. Gekühltes verpacktes Nahrungsmittelprodukt nach einem der Ansprüche 16 bis 18, bei dem das genannte gekochte Fleisch (33) ein Fleischstück mit einer Länge von mindestens 1 Zoll (2,54 cm) aufweist. 20
20. Gekühltes verpacktes Nahrungsmittelprodukt nach einem der Ansprüche 16 bis 19, bei dem das genannte gekochte Fleisch (33) ein ganzes Geflügelmuskelfleischstück ist. 25
21. Gekühltes verpacktes Nahrungsmittelprodukt nach einem der Ansprüche 16 bis 20, bei dem die genannte Soße (34) mit niedrigem pH-Wert eine Wasseraktivität von 0,92 oder niedriger aufweist. 30
22. Gekühltes verpacktes Nahrungsmittelprodukt nach einem der Ansprüche 16 bis 21, bei dem die genannte Soße (34) mit niedrigem pH-Wert ein anorganisches Salz bei zwischen 2 und 3 Gewichtsprozent basierend auf dem Gesamtgewicht der Soße mit niedrigem pH-Wert aufweist. 35
- Revendications** 40
1. Un procédé pour préparer un produit de viande conditionné, non surgelé, non fumé, ayant une durée de conservation réfrigérée étendue, comprenant : 45
- (a) la sélection d'un morceau de viande non cuit, non fumé, ayant une surface extérieure ;
- (b) le traitement du morceau de viande non cuit, non fumé avec une marinade contenant un sel inorganique, un sel lactate et un sel diacétate ; 50
- (c) le grillage d'une partie substantielle de ladite surface extérieure du morceau de viande et la cuisson du morceau de viande pour fournir un morceau de viande cuit ayant une température interne d'au moins 155°F (68°C) ;
- (d) le refroidissement dudit morceau de viande cuit à une température inférieure à la température ambiante et sans surgélation intérieure du morceau de viande cuit ;
- (e) le placement du morceau de viande cuit ainsi refroidi dans une poche et le placement d'une sauce à faible pH dans ladite poche, ladite sauce ayant un pH inférieur à 4,5 ;
- (f) le scellement de la poche avec le morceau de viande cuit et la sauce à faible pH à l'intérieur pour fournir une poche scellée contenant la viande cuite et la sauce à faible pH ; et
- (g) la commercialisation de ladite poche scellée ayant une viande cuite et une sauce à faible pH dans un état réfrigéré, non surgelé, ladite viande et sauce ayant une durée de conservation réfrigérée étendue.
2. Un procédé selon la revendication 1, où ladite sauce a un pH de 4,2 ou inférieur.
3. Un procédé selon la revendication 1 ou la revendication 2, où ladite sauce a un pH de 4,0 ou inférieur.
4. Un procédé selon l'une quelconque des revendications 1 à 3, où ladite sauce a un pH de 3,8 ou inférieur.
5. Un procédé selon l'une quelconque des revendications 1 à 4, incluant en plus l'addition d'une composition de caramel à ladite surface extérieure du morceau de viande avant d'effectuer l'opération de cuisson.
6. Un procédé selon l'une quelconque des revendications 1 à 5, où ledit traitement avec une marinade inclut un traitement avec un sel de phosphate.
7. Un procédé selon l'une quelconque des revendications 1 à 6, où ladite durée de conservation réfrigérée étendue de ladite commercialisation est d'au moins 60 jours.
8. Un procédé selon l'une quelconque des revendications 1 à 7, où ladite durée de conservation réfrigérée étendue de ladite commercialisation est d'au moins 90 jours.
9. Un procédé selon l'une quelconque des revendications 1 à 8, où lesdits morceaux de viande non cuits, non fumés, ont une longueur qui n'est pas inférieure à un pouce (2,54 cm).
10. Un procédé selon l'une quelconque des revendications 1 à 9, où lesdits morceaux de viande comprennent un produit tout muscle de volaille.
11. Un procédé selon l'une quelconque des revendications 1 à 10, où ladite sauce a une activité de l'eau de 0,92 ou inférieure.

12. Un procédé selon l'une quelconque des revendications 1 à 11, où ladite sauce a une activité de l'eau de 0,9 ou inférieure.
13. Un procédé selon l'une quelconque des revendications 1 à 12, incluant en plus les étapes de :
- la fourniture d'une barquette dimensionnée pour accueillir ladite poche scellée ayant la viande cuite et la sauce à faible pH, et l'introduction de ladite poche scellée dans ladite barquette ; et
la fermeture de ladite barquette de façon à sceller la poche à l'intérieur pour fournir un produit conditionné de viande cuite et sauce.
14. Un procédé selon la revendication 13, incluant en plus l'addition d'un manchon sur au moins une partie dudit produit conditionné de viande cuite et sauce pour fournir un produit alimentaire conditionné sous manchon comme le produit conditionné de viande et sauce ayant une durée de conservation réfrigérée étendue.
15. Un procédé selon la revendication 13 ou la revendication 14, où ladite barquette a un volume intérieur qui est dimensionné de manière à fournir un espace de gaz entre ladite poche scellée et ladite barquette.
16. Un produit alimentaire conditionné réfrigéré (21), comprenant :
- une barquette (22) ayant une paroi inférieure (24), un rebord annulaire (25) et une paroi latérale (23) joignant ensemble ladite paroi inférieure (24) et ledit rebord annulaire (25), ladite barquette (22) étant faite dans un matériau convenant pour chauffer l'aliment se trouvant à l'intérieur par un four à micro-ondes ;
un renforcement (37) dans ledit rebord annulaire (25) de la barquette (22) ;
un couvercle (26) fixé de manière amovible sur ledit rebord annulaire (25) de la barquette (22) et sur ledit renforcement (37) ;
une poche scellée de manière ouvrable (31) positionnée dans ladite barquette (22) avec ledit couvercle (26) fixé sur ledit rebord annulaire (25) ;
un produit alimentaire incluant un produit de viande cuite (33) obtenable en suivant les étapes (a) à (d) de la revendication 1 et une sauce (34) ayant un pH inférieur à 4,5 avant d'être combinée avec le produit de viande cuite, ledit produit alimentaire étant scellé dans ladite poche (31), ledit produit alimentaire étant à une température réfrigérée, non surgelée ;
un espace libre (32) entre ladite poche scellée (31) et ladite barquette (22) scellée avec le couvercle (25) ; et
une partie manchon (27) sur ladite barquette (22) qui a le couvercle (25) scellé dessus.
17. Un produit alimentaire conditionné réfrigéré selon la revendication 16, où ladite sauce à faible pH (34) a un pH qui n'est pas supérieur à 4,2.
18. Un produit alimentaire conditionné réfrigéré selon la revendication 16 ou la revendication 17, où ladite sauce à faible pH (34) a un pH qui n'est pas supérieur à 4,0.
19. Un produit alimentaire conditionné réfrigéré selon l'une quelconque des revendications 16 à 18, où ladite viande cuite (33) comprend un morceau de viande ayant une longueur d'au moins 1 pouce (2,54 cm).
20. Un produit alimentaire conditionné réfrigéré selon l'une quelconque des revendications 16 à 19, où ladite viande cuite (33) est un morceau tout muscle de volaille.
21. Un produit alimentaire conditionné réfrigéré selon l'une quelconque des revendications 16 à 20, où ladite sauce à faible pH (34) a une activité de l'eau de 0,92 ou inférieure.
22. Un produit alimentaire conditionné réfrigéré selon l'une quelconque des revendications 16 à 21, où ladite sauce à faible pH (34) inclut un sel inorganique à raison d'entre 2 et 3 pour cent du poids, basé sur le poids total de la sauce à faible pH.



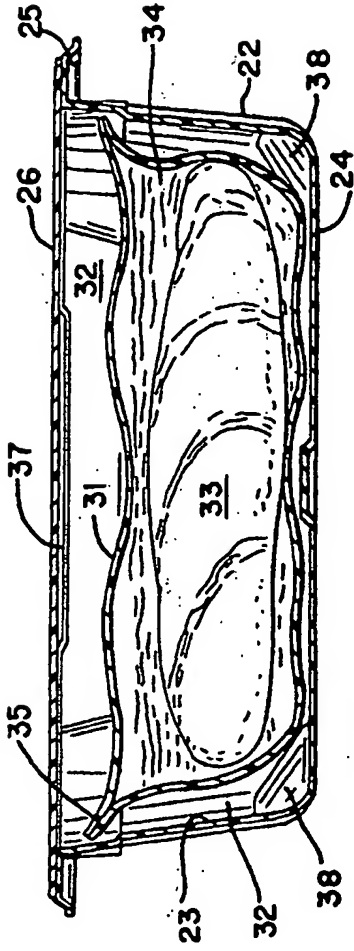


FIG. 2

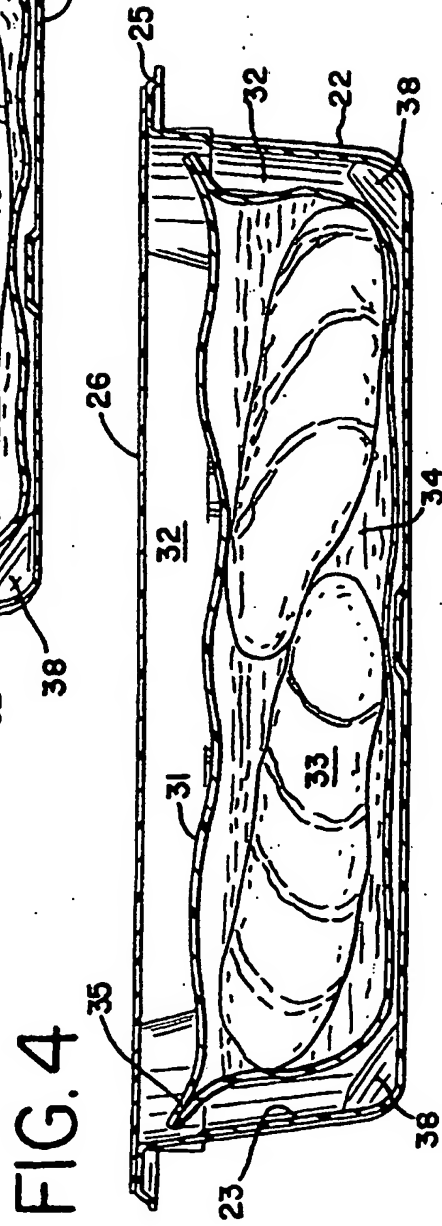


FIG. 4

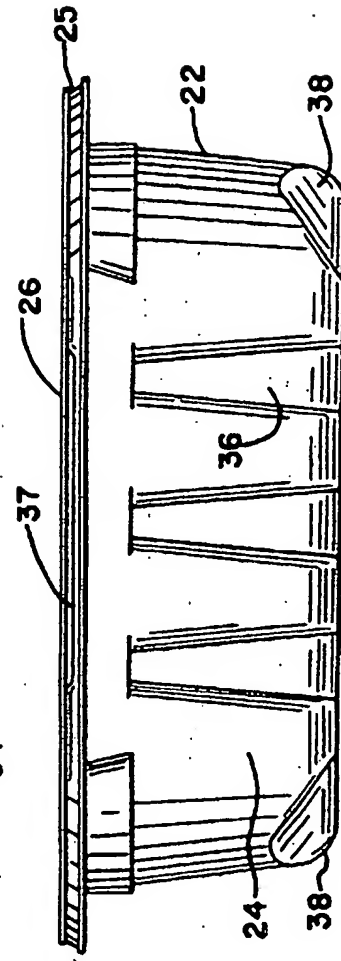
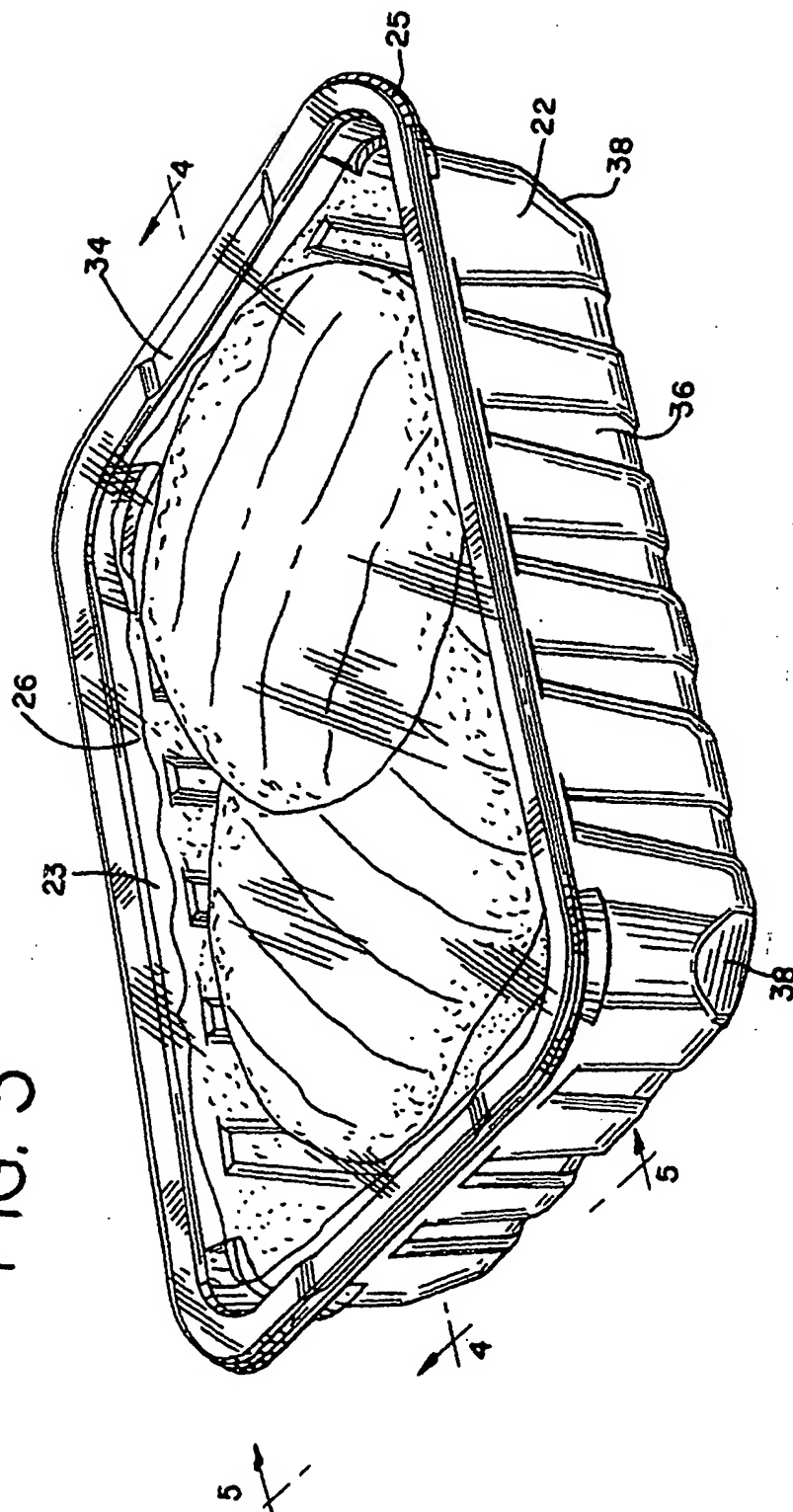


FIG. 5

FIG. 3



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